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The Monkey on Your Back?! Hierarchical Positions and Their Influence on Participants' Behaviour within Communities of Learning*

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Abstract:
Organizational learning has been identified as a pivotal aspect in contributing to the competitive advantage of organizations (e.g. Argote & Ingram, 2000). However, despite ambiguous results on their effectiveness, traditional programs continue to dominate organizational learning initiatives. In this context, *Communities of Learning* (CoL) are an innovative methodological tool to stimulate knowledge creation and diffusion among members of an organization's workforce. Previous research has shown that such (online) collaborative learning processes are significantly influenced by the hierarchical positions of individual participants within these communities (e.g. Romme, 1996). However, little is known about how exactly participants' hierarchical positions influence individual levels of activity and performance levels within CoLs. The present study provides empirical evidence on 27 CoLs of a global training program, analyzing user statistics from asynchronous discussion forums for 235 staff members. The results of our study not only indicate that participants' hierarchical position has a significant impact on their general level of activity, as well as their final grade. We are also able to reveal a group of "Stars" that lead their CoLs irrespective of their hierarchal position. Similarly, our findings suggest a certain duality among participants holding the lowest hierarchical positions. While the majority exhibits a "follower" mentality, a smaller subgroup appears to take on roles and behaviours usually assigned to team leaders. By considering these insights, managers of training programs can better anticipate participants' behaviour and device collaborative learning activities that foster a vibrant learning environment, contributing to higher levels of cognitive discourse and social interaction among participants.

Keywords: community of learning; online learning; organizational learning; hierarchy; diversity

JEL classification codes: D83, I21, I23

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Introduction

Numerous researchers have highlighted the importance of organizational learning as a pivotal aspect in contributing to the competitive advantage of organizations (e.g. Argote & Ingram, 2000; Nonaka, 1994). In today's turbulent economic environment, employers and employees constantly need to update their knowledge and skills in order to face new challenges (Chalmers & Keown, 2006). As a result, many organizations have undergone considerable efforts and dedicated sizable resources to facilitate organizational learning (Kane & Alavi, 2007). In this context, traditional teaching methodologies, such as on-the-job training and face-to-face formal courses, have continued to persist as the most commonly used format (Armstrong & Sadler-Smith, 2008). However, organizations are facing increasing pressures towards the pursuit of more effective, flexible and innovative learning methods, notably online collaborative learning (e.g. Armstrong & Sadler-Smith, 2008; Webster-Wright, 2009). Similarly to this growing attention towards online collaborative learning, teams have been identified as the central learning unit within organizations (Senge, 1990). As a result, organizations and scholars alike have become increasingly interested in underlying principles and resulting outcomes of how learning takes place within teams in general (Edmondson, 2002), as well as in an online environment (Owens, Neale & Sutton, 2000). And although the perspectives and findings on this topic remain fragmented (Kozlowski, Chao & Jensen, 2009), it has generally been established that the organizational context is the "800-pound gorilla" of these type of learning scenarios (Salas & Kozlowski, 2009). Learning does not occur in a vacuum. Teams, both in their regular working environments, as well as in the context of learning, increasingly consist of members with very diverse backgrounds, which can have an impact not only on the activity levels of members, but also on their performance (e.g. Barron, 2003; Bunderson, 2003b; Bunderson & Sutcliff, 2003; Foldy, et al., 2009; Lau & Murnighan, 1998`; Milliken & Martins, 1996; Simons, Pelled & Smith, 1999; van den Bossche, Gijselaers, Segers & Kirschner, 2006; van der Vegt & Bunderson, 2005; van der Vegt, Bunderson & Oosterhof, 2006; Webber & Donahue, 2001). And although the potential benefits of these settings are well understood (e.g. Bunderson & Sutcliffe, 2002), empirical studies have provided very mixed results (e.g. Jehn, Northcraft, & Neale, 1999; Simons, et al., 1999), suggesting that diversity appears to be a "double-edged sword" (Milliken & Martins, 1996). On the one hand, diversity has been found to create an atmosphere where members share their experiences, while acquiring various job-related skills and effectively processing new information (Jehn & Bezrukova, 2004). On the other hand, empirical evidence shows that members' diverse

backgrounds can create varying degrees of anxiety among team members, making them feel uncomfortable in communicating with their colleagues and thereby inhibiting their cognitive functioning in processing new information (Jehn, 1995). Managers and developers of training programs therefore need to pay specific attention to the underlying mechanisms of interpersonal processes that can influence and have an impact on learning (e.g. Armstrong & Sadler-Smith, 2008; Foldy, et al., 2009; van den Bossche, et al., 2006).

In this context, the most commonly considered factors of diversity are gender, ethnicity, expectations about outcomes and differences in individual's knowledge bases (e.g. Foldy, et al., 2009; Jehn, 1995). However, it has been suggested that participants' hierarchical positions also has to be carefully considered, as they constitute an important social resource for organizational power (e.g. Constant, Sproull, & Kiesler, 1996; Krackhardt, 1990; Wellman, 2001). Even more so, some researchers have suggested that hierarchies constitute a major obstacle to collaborative learning processes (e.g. Levinthal & March, 1993; Romme, 1996). However, past empirical research has either overlooked the role of power relations, as established by differing hierarchical backgrounds (Bunderson, 2003b), or focussed on teams that have continuous face-to-face contact (e.g. Simons, et al., 1999; Berger, Ridgeway, Fisek & Norman, 1998). In terms of online collaborative learning this topic continues to be debated and the empirical results remain equivocal. While some researchers found that the use of electronic communication technologies decreased the amount of hierarchical differences within teams (e.g. Edmondson, Bohmer & Pisano, 2001), others present evidence that hierarchical structures are transferred into the virtual realm, leaving already established behavioural patterns of team members unaffected (e.g. Thomas-Hunt, et al., 2003; Owens, et al., 2000). In contrast, evidence provided by Sproull and Kiesler (1986) suggests that hierarchy has no impact on the behaviour of team members, as measured by the level of communication between them. Consequently, there still remains considerable uncertainty about how learning processes are affected by the social relationships of wider institutional structures (Contu & Willmott, 2003) and how activity levels in online collaborative learning are sensitive to hierarchical positions of team members (Bunderson, 2003a).

The present study will contribute to this discussion by investigating what the influence of hierarchical positions is on individuals' level of activity and performance in Communities of Learning (CoL). CoLs can be considered as a derivative of Communitites of Practice (CoP), which belong to the most important online learning methodologies that have been developed in the field of organizational learning in recent years (e.g. Amin & Roberts, 2006). More specifically, CoLs are defined as groups of people "*engaging in collaborative learning and reflective*

practice involved in transformative learning" (Paloff & Pratt, 2003, p. 17). In practice, this translates into small teams, where individual participants articulate and share their own experiences, discuss them with their colleagues, incorporate newly gained knowledge and combine all these aspects in an attempt to apply them into their own working environments. Moreover, although participants can learn and benefit from each other, each individual is responsible for their own learning and performance. In contrast, teams are generally defined as "*a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems*" (Cohen & Bailey, 1997, p. 241). However, the edges between interacting teams, on the one hand, and more loosely organized groups of people engaging in collaborative activities, on the other hand, are generally considered to be blurry (Arrow, McGrath & Berdahl, 2000). We therefore consider CoLs a "team-like" groups, where individual members can be described as participants in the learning process. The CoLs, which form the basis for this empirical study, are taken from a global organizational learning program, where 337 participants from different hierarchical positions within the same organization collaboratively enhanced their knowledge and skills. More specifically, we will analyse 30 CoL and investigate whether observed behavioural patterns and outcomes were influenced by participants' hierarchical positions within the organization. The results of these analyses will provide important insights on group dynamics and patterns of communication among team members (Cramton & Willmott, 2003). A better understanding of these aspects can help managers of organizational learning programs to better anticipate participants' behaviours and device activities that stimulate participants to actively engage into knowledge diffusion and creation (Foldy, et al., 2009).

Online Collaborative Learning

Many organizations continue to focus their learning programs on traditional approaches such as on-the-job training and face-to-face formal courses (Armstrong & Sadler-Smith, 2008), where the employees are considered as "a container for a commodity called knowledge" (Webster-Wright, 2009, p. 713). Similarly, traditional learning programs are often associated with a "top-down" approach, focussing on explicit knowledge that has to be absorbed and that is embedded in texts and databases, rather than a workplace context (Eraut, 2004). On the one hand, this has been acknowledged to be well suited for laying the ground for more advanced learning (e.g. Soden & Halliday, 2000) and providing a comprehensive background to continue with more refined and practically oriented training (e.g. Robey, Khoo & Powers, 2000). On the other hand, scholars have criticised traditional learning programs precisely

for offering knowledge that is neutral to circumstances and only has limited applicability in real-life working environments (Eraut, 2000). Furthermore, only little and unconvincing evidence is available to show that newly gained knowledge from these programs is effectively transferred into the workplace (e.g. Johnson, 2001; Soden & Halliday, 2000). With ever growing time pressure and widely dispersed units, organizations need to find more dynamic and efficient ways for their workforces to learn and enhance their knowledge (Harun, 2001).

According to Fiol & Lyles (1985) organizational learning can be defined as "*the process of improving actions through better knowledge and understanding*" (p.803), which fits the conceptualization of the traditional learning approaches. In more recent considerations, Kane & Alavi (2007) have modified the definition by stating that organizational learning is "*the dynamic process of creating knowledge and transferring it to where it is needed and used, resulting in the creation of new knowledge for later transfer and use*." (p.796). In a similar vein, other authors have stipulated that learning is an interactive process, where knowledge is being created while collaborating in social networks (e.g. Hakkarainen, et al., 2004; Paavola, Lipponen, & Hakkarainen, 2004). By providing participants with the means to share their practical experiences, while applying the newly gained knowledge to their own working environments, each individual participant can contribute their own piece to the overall puzzle (Kozlowski, et al., 2009). Especially in an online environment this can create a "hothouse" for new ideas and thoughts (Schlager, Fusco & Schank, 2002). When employees from across business units and regions can engage in online collaborative learning, they can help each other to get acquainted with the practical "ins-and-outs" of a certain content domain, while sharing experiences and creating new ideas that can help to improve the business process (Leonard & Sensiper, 1998). Consequently, it is suggested that online collaborative learning can enhance the outcomes of training programs, compared to traditional pedagogies (e.g. Brower, 2003; Harun, 2001; Rehm, 2009; Thomas-Hunt, Odgen & Neale, 2003). Some researchers have even proclaimed a superiority of these online collaborative learning methods for adult learners (e.g. Armstrong & Sadler-Smith, 2008), where online learning is defined as incorporating elements such as the use of technical media, e.g. asynchronous discussion forums, and a quasi-permanent separation of educational staff and participants for the duration of the learning process (Bryant, Kahle, & Schafer, 2005; Keegan, 1980). However, recent findings have shown that participants react differently to this type of online interaction, translating into significant differences in the amount and level of discourse (e.g. Caspi, Gorsky, & Chajut, 2003; Rienties, Tempelaar, Van den Bossche, Gijselaers & Segers, 2009). New insights are therefore required on the conversational patterns within online collaborative learning programs, in order to better

understand how this approach can contribute to the learning process of participants (van den Bossche, Gijselaers, Segers, Woltjer & Kirschner, in press).

Communities of Learning

Numerous researchers have suggested that *Communities of Practice* (CoPs) have the potential to stimulate an effective exchange of knowledge and experience between members of an organization's workforce, connecting different hierarchical levels and contributing to the knowledge creation of the entire organization (e.g. Hakkarainen, Palonen, Paavola, & Lehtinen, 2004; Paavola, Lipponen, & Hakkarainen, 2004; Peltonen & Lamsa, 2004). Conceptualized by Lave & Wenger (1991), CoPs constitute "*groups of people who share a concern, set of problems or passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis*" (Wenger, McDermott, & Snyder, 2002, p.4). Organizations that have already successfully implemented CoPs include DaimlerChrysler, where participants of "tech clubs" collaborate to cut R&D costs, as well as Hewlett-Packard, where product delivery consultants discuss ways to further minimize computer downtime for customers (Wenger & Snyder, 2000).

However, researchers have begun to question the degree with which the structure of CoPs can be applied to formal training programs and suggested that the concept needs to be adapted to fit the context of organizational learning (e.g. Fowler & Mayes, 1999; Nachmias, Mioduser, Oren, & Ram, 2000). As a result, a general shift towards "*Communities of Learning*" (CoL) has been promoted (Stacey, Smith & Barty, 2004), as this would imply a higher degree of structure and formality compared to CoPs (Zhang, Fang, Wei & Chen, in press). In contrast to CoPs, this entails clearly defined timelines. While this constitutes an inherent characteristic of formal learning initiatives, this also requires participants to actively participate in the exchange of experiences and the creation of new knowledge within a certain timeframe. Otherwise, they might lack the necessary drive to continuously stay engaged with the program. Additionally, participation in CoLs is obligatory. While CoPs allow participants to participate if and when they like, CoLs require participants to engage into collaborative activities. Finally, being implemented in a formal, organizational context, all activities within CoLs will automatically be validated and legitimized. Taken together, these additional levels of structure have generally been identified as very important for organizational training initiatives in today's changing business environment (Chalmers & Keown, 2006; Handzic & Tolhurst, 2002; Rehm, 2009). Given its growing popularity and importance, a considerable amount of research has already identified possible success factors for online communities (e.g. de Laat & Lally, 2003; Stacey, et al., 2004). Yet, current

research has neglected CoLs and the extend with which findings on CoPs can be translated into this framework, or how participants' levels of activity in collaborative online communities are sensitive to hierarchical positions of community members (Bunderson, 2003b).

Impact of Hierarchical Diversity on Learning

Diversity can stem from a wide range of factors that are generally categorized into three main types, namely value diversity, informational diversity, and social category diversity (e.g. Jehn, et al, 1999; Pelled, Eisenhardt & Xin, 1999; van den Bossche, et al., 2006). Value diversity is characterized by differences in participants' expectations and goals with respect to the collaborative activities. If these differences are significant, tensions and conflicts can develop that affect the way participants engage into collaboration. Informational diversity refers to differences in participants' knowledge bases. If participants significantly differ in this respect this can explain observed patterns for both activity, as well as performance. More specifically, if an individual participant already has considerable knowledge about a certain topic they are not only likely to feel more comfortable in contributing to discussions, but also to perform better irrespective of their hierarchical position. Additionally, differences in knowledge bases also increase the likelihood that members of a CoL hold diverse perspectives and opinions, which in turn can cause potential tensions and conflicts. Social category diversity captures explicit differences among group members, such as age, gender and ethnicity.

In addition, it has been increasingly acknowledged that participants hierarchical positions can also have a considerable impact on collaborative learning processes (e.g. Levinthal & March, 1993; Romme, 1996). Generally, scholars have proposed that, depending on their hierarchical position, participants will display varying levels of activity within collaborative learning processes (e.g., Bird, 1994; Owens, et al., 2000). Based on qualitative data from on-going workgroups and focussing on the level of participation within learning teams, Owens et al., (2000) suggest a positive relationship between the hierarchical position of participants and their level of activity. Hence, members from lower hierarchical positions will mainly follow discussions and rarely interject. This behaviour is triggered by a propensity to integrate into the group, trying to blend in while not upsetting the status quo. On the contrary, representatives from higher up in an organization's hierarchy tend to replicate their normal behaviour and also lead virtual teams. This mode of conduct is suggested to stem from a drive to dominate discussions, in order to reinforce the prevailing status quo. Similarly, Yates & Orlikowski (1992) argue that top management will spent more time to proactively setting the tone, as they are concerned with loosing control of virtual teams, which could

feed through, and possibly cause a decrease of power in the real world. Similarly, other researchers have suggested that lower management is subject to a certain "fear of speaking up and making mistakes in the group" (Edmondson, 2002, p. 139), leading them to be more passive in discussions (e.g. Nembhard & Edmondson, 2006). Consequently, building upon previous considerations and in order to provide empirical evidence on the relationship between participants' hierarchical position and their level of activity within CoLs, our first research hypothesis is *H1 – As the hierarchical position of an individual increases, so does their level of activity in a CoL.*

In order to make more complete inferences on the impact of hierarchical positions on CoLs, and taking into account the organized character of organizational training initiatives, we extend the analysis to also incorporate measures that test for participants' performance. In an organizational training framework, this notion has largely been neglected. Previous studies on the impact of hierarchical diversity on the performance of teams have generally considered performance at the organizational level, for example in terms of profitability or sales (e.g. Simons, et al., 1999), at the team level (Bunderson, 2003a), or as a mechanism to allocate rewards within a team (e.g. Berger, et al., 1998). However, within CoLs participants usually are assessed individually and their performance neither directly depends, nor directly influences the performance of other team members. Considering this vital difference, Gijselaers, Arts, Boshuizen, & Segers (2006) argued that individuals from top and middle management are driven by experience, being able to effectively infer upon new information and make meaningful connections with their immediate working environments. In contrast, while lower management can better recall theoretical knowledge and replicate new information, they require more time to effectively strike a link between newly gained knowledge and its practical application. Similarly, Bunderson (2003b) has stipulated that more senior managers are more used to integrating information from different functional areas and disciplines. Consequently, when participants' performance is not only assessed on how well they comprehend new information, but also on how well they can integrate new knowledge in their own environments, our second research hypothesis states that *H2 – As participants' hierarchical position increases, their performance level in a CoL will increase as well.*

Method

Setting

The aim of the training program was to secure the organization's impact in its daily practice by enhancing the capacity and skills of its staff. The training program was delivered twice over a timeframe of approximately 6 month

and specifically focused on five pre-defined focal areas, all dealing with different aspects of Economics. Staff members had to be nominated by their supervisors in order to be eligible to participate. Upon successful completion, participants could attain a certificate of participation together with academic credits that were based on the European Credit Transfer and Accumulation System (ECTS). The program built on a blended learning approach. The online part, on which the focus of this article will be, entirely took place online and over a time span of fourteen weeks, with no scheduled real-time meetings. All content materials, as well as collaborative learning activities, were hosted by a virtual learning environment (VLE), powered by Blackboard©. More specifically, each content module consisted of recorded lectures, voluntary, formative multiple choice tests and readings, which were subdivided into *Fundamental* and *Applied Readings.* The Fundamental Readings were voluntary and represented a kind of safety net in case participants required a general introduction into a certain topic. The Applied Readings focused on empirical, very practical research that was relevant for the work of the organization's staff members.

The backbone of the online part consisted of small CoLs, which each was made up of 10 – 15 randomly assigned participants. The random assignment was chosen to circumvent the possibility of the training's managers to subconsciously let their opinions and preferences influence the way in which participants were distributed amongst the CoLs (Gigerenzer, Swijtink, Porter, Datson, Beatty, & Krüger, 1989). Within these CoLs, participants collaboratively discussed real-life tasks via asynchronous discussion forums. The content of the tasks was placed in the every day working environments of the participants (e.g. Savery & Duffy 1995). Each focal area had a separate task and discussion forum. Appendix A provides a typical example of a discussion that took place within a CoL. Participation in these forums was obligatory and taken into account for the grading procedures. Moreover, in order to facilitate the discussions, to provide help in case of technical difficulties, and to assess the participants' performance, two academic staff members were assigned to each CoL. The facilitators were trained accordingly and received elaborate answer keys for all activities that had to be assessed. Furthermore, they were instructed to award increasing grades when participants were not only able to replicate the new knowledge, but also able to integrate and evaluate it in their own and other frameworks. As a result, a high grade can be interpreted as a preliminarily indication of higher levels of knowledge construction and hence learning. The level of interdependence among the participants was low, as they were assessed individually. Consequently, one CoL member's performace neither directly depended, nor influenced the performance of others.

In addition to these obligatory, content-driven discussion forums, each CoL also had its own "Café-Talk" forum, where participants could get to know each other, socialize and exchanged private, non-content related information (e.g. Nonaka, 1994; Smith, 2001). They were stimulated to introduce themselves, indicating their area of work, professional experience, but also share information about their family lives. Appendix B summarizes a typical discussion within such a forum. Furthermore, these forums provided the only opportunity for participants to get to know each others' hierarchical position in the organization. Unless participants provided this information themselves, their fellow members of the CoL had no way of knowing about this.

At the end of the e-Learning phase, participants had to complete a final exam and received a final grade. A more detailed description of the grading procedure will be provided in the next section. On a scale from 1 (very poor) to 10 (very good), the minimum requirement to pass the online part was 5.5. In case participants failed to fulfil this requirement, the organization's headquarters reserved the right to prohibited them to take part in the face-to-face workshop of the training programme, which was also required to attain the course certificate.

Participants

Overall, 346 participants were randomly assigned to 30 CoLs. The CoLs had an average of 11.63 members (SD = 1.59, range = 7 – 15). The average age was 44.68 (SD = 7.39, range = 27 – 59) and 54 % of the participants were female. Overall, 100 nationalities were represented in the CoLs and 8 operational regions, in which the organization is conducting business. The participants' educational backgrounds included Master's (70.90 %), PhD's (14.72 %), Bachelor's (7.36 %) and other degrees (4.35 %), from such domains as engineering. The underlying disciplines included, among others, Health Sciences, Geography, International Law and Sociology. With respect to the hierarchical positions, the composition of participants has been evenly distributed, with 114 of the participants belonging to low hierarchical positions (32.90 %), compared to 128 (37 %) and 104 (30.10 %) for middle and high hierarchical positions respectively.

Instruments

Controlling for Different Sources of Diversity

In order to control for value diversity, informational diversity, and social category diversity, which might have influenced how individuals participate and perform within CoLs, this research paper will follow the approach of

previous studies and estimate the applicable factors via different measures (e.g. Jehn, et al, 1999; Pelled, et al., 1999; van den Bossche, et al., 2006).

First, value diversity is estimated via an online questionnaire that was distributed to participants prior to the start of the e-Learning Phase of the training program. The focus here was on participants' expectations and goals. This instrument was based on a previous version developed at Maastricht University (Giesbers, Rienties, Gijselaers, Segers & Tempelaar, 2009; Rienties, Tempelaar, Waterval, Rehm & Gijselaers, 2006) and included some adjustments to fit the context of organizational training. The questionnaire consisted of 24 questions, subdivided into four categories, and was administered with a 7-point Likert scale ranging from 1 (not true for me at all) to 7 (completely true for me). The four categories were identical to the ones developed by Rienties et al. (2006) and included (the number of questions are reported in brackets): 'Reasons to join the course' (6), 'Course design' (4), 'Expectations and goals' (10) and 'Group collaboration' (4). The response rate for the questionnaire was 89.39 %.

Second, informational diversity was accounted for by considering participants' educational background, which they indicated as part of the official registration procedures, and by measuring participants' prior knowledge on basic concepts and theories that were covered in the five pre-defined focal areas by a second online questionnaire. In essence, this questionnaire was a diagnostic test, consisting of 25 multiple choice questions that related to the working environment of the participants. The response rate for the questionnaire was 88.76 %.

Finally, social category diversity was determined via the program's general registration form that participants had to fill in prior to the start of the training. As a proxy for the ethnical background of participants their self-reported country of birth was used.

The Level of Activity within the Discussion Forums

In accordance with previous research, the present study will define the level of activity as the quantitative contributions within discussion forums, measured by the amount of individual participant's threads (e.g. Harasim, 1993; Järvelä & Häkkinen, 2002; Picciano, 2002; Strijbos, Martens, Prins & Jochems, 2006). This approach provides valuable insights into the interaction patterns among participants, without interrupting the actual learning process (Zembylas & Vrasidas, 2007). The data was determined on the basis of user statistics from the discussion forums, which provided information on the amount of contributions per participant in the individual discussion forums. This provided the input to compute the cumulative scores that indicated the overall level of activity in the different CoLs. Moreover, to gain additional insights on possible behavioural patterns in CoLs, the length of

participants' contributions was considered (e.g. Guldberg, 2008), which this paper measured by the total amount of characters of a single thread. Summing these values yielded the overall length of all contributions, which was then used to determine the average statement length, by dividing the applicable figure by the total amount of contributions per participant. Additionally, the type of contributions made by participants, either focussing on cognitive processing activities, or social behaviour, was determined (e.g. Schellens & Valcke, 2005). For the latter this was achieved by summing an individual participant's contributions in the "Café-Talk" forum of their CoL. In order to determine the level of content-driven activity, this paper aggregated participants' contribution in the applicable discussion forums of the five focal areas. Finally, each discussion thread included a time-stamp, which allowed an investigation of how the level of activity might have changed over time. In the context of this research paper, the contributions were subdivided into five equal time intervals, each lasting about two weeks.

Data on Participants' Hierarchical Position

In order to describe the impact of hierarchical positions on the level of activity of individual participants, additional descriptive data were collected. This information was collected by means of a general registration form that participants had to fill in prior to the start of the program (e.g. Bunderson, 2003b; Jehn & Bezrukova, 2004). The participants' hierarchical position was self-reported and subject to the organization's official job categories. Based on the target group of the training program, three main categories were applicable. For the purpose of this paper these categories were recoded into "Low"-, "Middle"- and "High"-level hierarchical positions. Generally, representatives of the "Low" group are mainly associated with project level work, contributing to sub-parts of the overall product. Members of the "Middle" group are usually the leaders of such projects. Finally, participants from the "High" group tend to be responsible for departments and often entire regions in which the organization is operating.

Performance Measures of the Participants

Similar to previous studies that investigated performance levels of graduate students in online learning communities (e.g. Cho, Gay, Davidson & Ingraffea, 2007; Tutty & Klein, 2008; Wang, 2004), the performance of the individual participants was measured by a final grade, which consisted of two component parts. First, participants' contributions in the discussion forums were evaluated, constituting 50 % of the final grade. Second, the e-Learning Phase was concluded with an open-question type exam that was based on the topics discussed in the forums, and

which also constituted 50 % of the final grade. Both grades were determined by the academic staff that facilitated the CoLs during the entire period of the e-Learning Phase, and were administered on a scale from 1 (very poor) to 10 (very good).

Data Analysis

In order to determine the degree of hierarchical diversity within the different CoLs, this research paper used an entropy index (e.g. Ancona & Caldwell, 1992; Jehn & Bezrukova, 2004; Teachman, 1980).

$$-\sum_{i=1}^{s} P_i(\ln P_i)$$

Based on the fractional shares of members from different hierarchical positions within a CoL (P_i), this index provides a measure of heterogeneity that can be compared. Moreover, based on this measure, the Shannon Equitability Index (e.g. Magurran, 1988; Schwarze & Zeller, 2005) can be calculated

$$\left(-\sum_{i=1}^{s} P_i(\ln P_i)\right) / \ln S$$

where S is the amount of participants within a group. The index can range from 0 to 1 and states the percentage share of hierarchical diversity in relation to the maximal possible diversity within a given CoL. On the basis of the resulting findings, we could then identify possible outliers amongst the CoLs that might have been constructed of a biased mix of participants, only representing one of the three hierarchical positions and thereby obstructing the results of the data analysis.

The main data analysis was based on a multi-method approach, which is in line with the recommendations of recent research investigating interaction patterns in similar online collaborative learning settings (e.g. de Laat, Lipponen & Simons, 2007). First, hypothesis testing was used to investigate the validity of the research statements H1 and H2. In order to test for the parametric assumption of normality of the data's distribution a number of Kolmogorov-Smirnov tests were conducted. The results revealed that the normality assumption was violated for all measured variables and consequently non-parametric tests were used to examine the research hypotheses. More specifically, correlations were determined with the Spearman's rho measure (r_s). To substitute for ANOVA tests, the Kruskal-Wallis method (H) was used. Whether potential differences exhibited a linear trend was determined via Jonckheere-Terpstra tests (J-T). The occurrence of possible patterns underlying the Kruskall-Wallis results was

determined by a range of post hoc Mann-Whitney (U) tests. Being designed to only measure differences between two independent conditions, the U-test results were then adjusted by the Bonferroni correction method, which took into account the larger number of investigated groups. Consequently, the typical critical value of significance (.05) was divided by the number of different groups, which yielded an adjusted critical value of 0.016 for this part of the analysis. Finally, considering the work of Cohen (1992), we also estimated the effect size of our findings. This procedure has become increasingly common in research, as provides an indication of the strength of relationships (Trusty, Thompson, Petrocelli, 2004). However, the vast majority of effect size measures is only suitable for parametric data (Snyder & Lawson, 1993). Consequently, we followed the suggestion of Rosenthal (1991) and approximate the effect size on the basis of the Mann-Whitney results according to the formula:

$$\text{Effect Size (r)} = z/\sqrt{N}$$

where z is the z-score from the analysis and N refers to the size of the population in question. This measure can take on values from 0 to 1, where small, medium and large effects are associated with .10, .30 and .50, respectively (Cohen, 1992; Keppel & Wickens, 2004).

Second, and taking into account that the underlying data consisted of a mixture of categorical and continuous variables, this study used two-step cluster analysis (Banfield & Raftery, 1993; Melia & Heckerman, 1998; Norušis, 2010). The underlying reason for this approach was to investigate patterns in the available data set that might have been overlooked by the previous methods. More specifically, the previous methods clearly focussed on the potential role of participants' hierarchical positions on their participation and performance within CoLs. By segmenting the available data into homogenous subgroups of cases, the two-step cluster analysis could either provide supportive evidence for the claim that hierarchical positions are an important factor in CoLs, or highlight additional relationships that need to be taken into account for future studies. The optimal amount of clusters was based on the Schwarz's Bayesian criterion (BIC) and log-likelihood was used as the distance measure.

Results

Degree of Hierarchical Diversity within the CoLs

The initial results of the entropy index revealed three outliers amongst the CoLs, which turned out to be constructed of a highly biased sample of participants, representing only one of the three hierarchical positions. Consequently, these CoLs were removed from the overall sample, in order to ensure unbiased results. The average score of the entropy index then for the remaining 27 CoLs was .99 (SD = .11, range = .69 – 1.09). The resulting Shannon's Equitability Index had an average score of .46 (SD = .06, range = .33 – .56). Considering that the latter index can take on values between 0 (complete heterogeneity) and 1 (complete homogeneity), the result indicates a considerable amount of diversity within the CoLs. Moreover, taking into account the low standard deviation of .06, the CoLs all appear to be subject to comparable levels of hierarchical diversity and therefore provide representative samples. As a result of removing the outliers, the present study then analysed a subset of 235 participants (67.91%). Comparing this to previous studies on similar topics, this still constitutes a representative sample size (e.g. Brower, 2003; Simons, et al., 1999; Thursby, Fuller & Thursby, 2009). The 30 CoLs had an average of 8.70 members (SD = 1.94, range = 6 – 13). The average age was 43.90 (SD = 7.26, range = 29 – 59) and 54 % of the participants were female. Overall, 100 nationalities were represented in the CoLs and 8 operational regions, in which the organization is conducting business. The participants' educational backgrounds included Master's (72.71 %), PhD's (14.91 %), Bachelor's (7.89 %) and other degrees (4.38 %), from such domains as engineering. The underlying disciplines included, among others, Health Sciences, Geography, International Law and Sociology. With respect to the hierarchical positions, the composition of participants has been evenly distributed, with 80 of the participants belonging to low hierarchical positions (34 %), compared to 89 (37.90 %) and 66 (28.10 %) for middle and high hierarchical positions respectively.

Controlling for Different Sources of Diversity

The investigation of whether participants differed in terms of their expectations, subject to their hierarchical positions, revealed a significant result for one of the applicable four categories, namely "Expectations and Goals" ($H(2) = 7.548$, $p = .023$). Interestingly, a detailed look at each individual item of this category exposed that this difference is only driven by two statements, namely "One of my goals is to master a lot of new skills in this training program." ($H(2) = 10.291$, $p = .006$) and "It's important to me that I learn a lot of new concepts during this training program." ($H(2) = 9.536$, $p = .008$). Additionally, the results of a Jonckheere-Terpstra test indicate a negative relationship between the two items and the hierarchical position of a participant. Hence, representatives of "High"

attach the lowest values to these two statements, whereas they seem to be important for members of the "Low" group. The analysis of informational diversity, as well as social category diversity both yielded insignificant results, indicating that any findings from the multi-method approach will not have been affected by these aspects. Considering these findings, we can therefore stipulate that any possible observed differences in activity or performance levels between the different groups cannot be explained by participants' gender, ethnicity, or prior knowledge. Moreover, when interpreting the final results of this study, we have to take into account the minor signs of value diversity among participants.

Hypotheses Testing

Table 1 provides an overview of the initial correlation analysis. At first glance, there appears to be a distinctive positive relationship between participants' hierarchical position and their level of activity, as measured by their total amount of contributions (r_s = .19, $p < .01$). Interestingly, this relationship is clearly driven by the amount of contributions in the content-related forums (r_s = .20, $p < .01$). Conversely, no significant difference between the levels of activity in the "Café-Talk" forums could be found. This finding is further supported by Figure 1, which provides a graphical representation of the average amount contributions per type of discussion forum. While all participants, irrespective of their hierarchical background, contribute almost equally to the "Café-Talk" forum, noticeable differences can be observed for the content-driven forums that are at the centre of the CoLs.

Table 1: Overview of Correlations between Hierarchical Position and Activity Measures.

	1	2	3	4	5	6
1. Hierarchical Position	1	0.19**	0.00	0.20**	0.24**	0.16*
2. Total Contributions		1	0.42**	0.98**	0.81**	0.07
3. Café-Talk Forums			1	0.30**	0.30**	-0.12
4. Content-Related Forums				1	0.82**	0.10
5. Statement Length					1	0.59**
6. Average Statement Length						1

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed).

In order to gain more detailed insights on the difference between the groups, a Kruskall-Wallis test (H) was employed, providing further evidence that the hierarchical position of a participant had a significant impact on their general level of activity ($H(2) = 8.705$, $p = .013$). Again, this difference can be solely attributed to the activity in the content-driven forums ($H(2) = 9.622$, $p = .008$), rather than the one in the "Café-Talk" forums ($H(2) = .657$, p

= .720). Additionally, a Jonckheere-Terpstra test validated the indicated positive relationship between hierarchical position and the level of activity (J-T = 10,815.00, z = 2.968, p = .003). Following up on these findings, and now focussing on the content-driven forums, the results of the Mann-Whitney tests show that the difference in contributions is especially pronounced between "Low" and "High" (U = 1856.00, p = .002). In contrast, the comparison of "Middle" and "High" (U = 2461.50, p = .085), and "Low" and "Middle" (U = 3068.00, p = .121) yielded less pronounced, or even insignificant results. In order to provide a more refined picture on the levels of activity, we also looked at the total and average length of contributions. As can be seen from Table 1, the correlation coefficients for overall statement length (r_s = .235, p < .01) and average statement length (r_s = .158, p < .05) are both significant. Likewise, the results of the Kruskal-Wallis tests are also significant for the overall (H(2) = 11.190,00 p < .001) and average statement length (H(2) = 10.489,00 p = .017). Another set of Jonckheere-Terpstra tests further supported this finding and also indicated a positive relationship between hierarchical position and overall (J-T = 11,190.00, z = 3.628, p < .001), as well as average statement length (J-T = 10,489.00, z = 2.389, p = .017). When dissecting the main effect into its component parts, again using Mann-Whitney tests, we again found that the difference between groups is especially prominent between "Low" and "High".

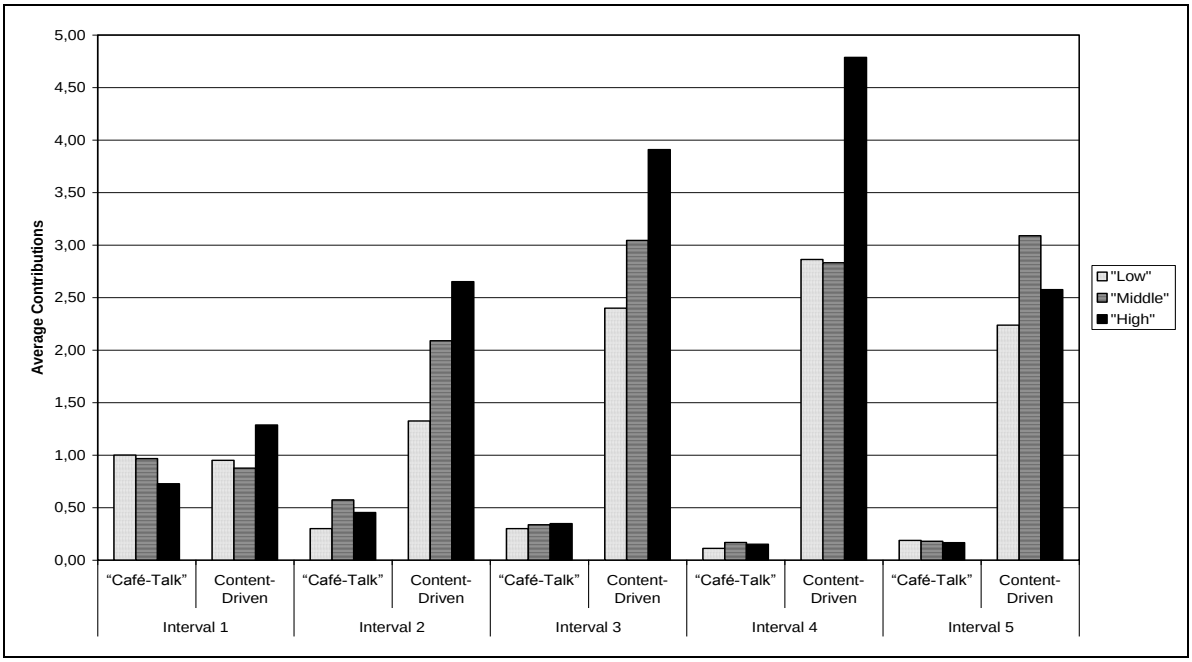

Figure 1. Average Contributions per Interval of Time and Type of Forum.

Finally, we were interested in the dynamics of the activity levels and investigated whether and how the participation in the forums might have changed over time. As can be seen from Figure 1, while at the beginning (Interval 1) of the CoLs all participants were very similar in terms of contributions, the latter intervals exhibit more differences between the groups. This visual impression is further supported by the results of another set of Kruskall-Wallis tests (H). While the differences are insignificant for Interval 1 ($H(2) = 1.153$, $p = .562$), Interval 2 ($H(2) = 10.377$, $p = .006$), Interval 3 ($H(2) = 6.365$, $p = .041$) and Interval 4 ($H(2) = 7.193$, $p = .027$) show highly significant results. Interestingly, the gap then closes again for Interval 5, where the observed differences is only significant at a 10 percent level ($H(2) = 5.087$, $p = 0.079$). When comparing the different groups the same picture emerges as before, namely that the most pronounced differences can be found between "Low" and "High". We can therefore stipulate that there is a positive and significant relationship between the hierarchical position of a participant and their level of activity within a CoL. However, this does not yet provide any indication about the actual strength of this relationship. Consequently, Table 2 summarizes the applicable effect sizes. As can be seen from the provided results, and in line with what has been discussed before, the impact of hierarchical position on participants' levels of activity remains less pronounced for comparisons between "Low" and "Middle", as well as "Middle" and "High". However, when taking a closer look at the results for our comparisons between "Low" and "High", we find acceptable effect sizes for our main measures of activity levels, namely total amount of contributions, statement length and average statement length. Overall, we therefore accept our first research hypothesis (H1) that the higher the hierarchical position of a participant, the higher their level of activity will be within a CoL.

Table 2: Overview of Effect Sizes for Levels of Activity

	Interval 1	Interval 2	Interval 3	Interval 4	Interval 5	Total	Statement Length	Average Statement Length
"Low" vs "Middle"	-0.07	-0.17	-0.06	0.00	-0.17	-0.13	-0.13	-0.09
"Low" vs "High"	-0.01	-0.26	-0.21	-0.20	-0.13	-0.24	-0.29	-0.20
"Middle" vs "High"	-0.07	-0.09	-0.14	-0.19	-0.05	-0.11	-0.18	-0.11

The second research hypothesis (H2) focused on the impact of hierarchical positions on participants' performance levels. Using a similar approach as for hypothesis one, we first conducted a correlation analysis. The results are summarized in Table 3 and clearly indicate a significant and positive relationship between hierarchical position and participation grade ($r_s = .15$, $p < .05$), final exam grade ($r_s = .20$, $p < .01$) and final grade ($r_s = .23$, p

< .01). Figure 2 provides a graphical representation of the average grades for the different measures and hierarchical positions.

Table 3: Overview of Correlations between Hierarchical Position and Performance Measures.

	1	2	3	4
1. Hierarchical Position	1	0.15*	0.20**	0.23**
2. Participation Grade		1	0.30**	0.70**
3. Final Exam			1	0.47**
4. Final Grade				1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

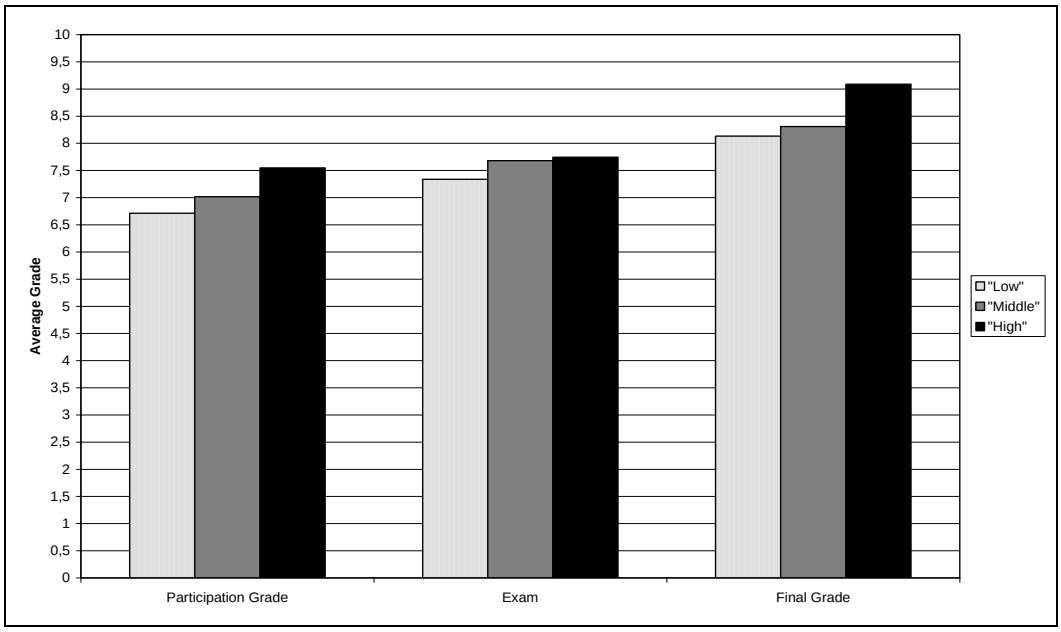

Figure 2. Average Grades per Type of Performance Measure.

In determining whether the differences in the scores are significant, another set of Kruskal-Wallis tests (H) yielded significant results for all measured performance indicators; the participation grade ($H(2) = 6.156$, $p = .046$), the final exam ($H(2) = 10.597$, $p = .005$), as well as the final grade ($H(2) = 15.759$, $p < .001$). In order to determine the component parts of the main effect, another range of Mann-Whitney tests was conducted. When comparing "Low" and "Middle", only the difference in final exam scores was significant ($U = 2714.00$, $p = .007$). Contrasting "Middle" and "High" yielded significant results for the difference in final grades ($U = 2003.00$, $p = .001$). Finally, comparing "Low" and "High", revealed again the greatest differences, with significant test scores for participation grade ($U = 2039.50$, $p = .017$), final exam ($U = 1925.50$, $p = .004$) and final grade ($U = 1729.00$, $p < .001$). Similarly

to our investigation of the first research hypothesis, this general trend was also again found in our results for the effect sizes. As can be seen from Table 4, the impact of hierarchical position on performance levels is most noticeable when comparing “Low” and “High”.

Based on these findings, we tentatively accept our second research hypothesis (H2). Although the main effect clearly indicates that the hierarchical position of individual participants has an impact on their performance level in a CoL, the results on the component parts are more ambiguous, only providing supportive evidence for some of the measured performance indicators.

Table 4: Overview of Effect Sizes for Performance Measures

	Participation Grade	Exam	Final Grade
"Low" vs "Middle"	-0.05	-0.21	-0.03
"Low" vs "High"	-0.18	-0.22	-0.28
"Middle" vs "High"	-0.14	-0.05	-0.26

Two-Step Cluster Analysis

The third part of our multi-method approach dealt with segmenting the available data and identifying possible clusters of homogenous subgroups among participants, without presupposing membership in a certain group and exhibiting similar activity and performance levels. In this context, and in line with our research hypotheses, we employed two sets of two-step cluster analysis, namely one on the levels of activity and one on the performance levels. The first set considered the type of contributions, the total and average statement length, the overall level of activity and participants’ hierarchical position. Based on the BIC values, this resulted in an optimal amount of clusters of four. Table 6 numerically summarizes how the hierarchical positions were distributed across the clusters. Interestingly, each hierarchical position has been assigned to a separate cluster, indicating that they exhibit very similar behavioural patterns. Additionally, a new group, namely cluster 3, has been identified that could be labelled as “Stars”.

As can be seen in Table 7, participants from this particular cluster are leading their CoLs in terms of quantitative contributions irrespective of their hierarchal position. This is a striking finding, as it suggests that the “Low” group is more complex than initially stipulated by the hypotheses tests. Whereas the large majority of the group continues to confirm expectations and merely follow discussions, a small subset of participants is able to “break out” of the common pattern and not exhibit a “fear of speaking up”. Moreover, at a general level, the data in

Table 5 further strengthen the findings of the previous two analyses, as the scores also indicate a positive relationship between participants' hierarchical positions and their level of activity.

Table 6: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Activity Patterns.

	"Low"		"Middle"		"High"	
Cluster	N	%	N	%	N	%
1	76	95.00	0	0.00	0	0.00
2	0	0.00	86	96.63	0	0.00
3	4	5.00	3	3.37	5	7.58
4	0	0.00	0	0.00	61	92.42

Table 7: Overview Results of Two-Step Cluster Analysis on Activity Patterns.

	Cafe-Talk Forum		Content-Related Forum		Statement Length		Average Statement Length		Total Contributions	
Cluster	M	SD	M	SD	M	SD	M	SD	M	SD
1	1.49	1.27	8.66	6.10	12,211.18	9,713.85	1,221.28	831.01	9.99	6.65
2	1.90	1.95	11.10	7.68	15,414.29	11,563.70	1,298.98	840.98	12.83	8.27
3	10.17	5.56	39.42	14.35	60,962.67	38,586.04	1,195.92	548.78	48.00	15.30
4	1.39	1.20	13.36	9.06	21,698.80	16,627.87	1,481.93	852.88	14.46	9.05

The second cluster analysis specifically focussed on participants' performance levels, namely the participation grade, the exam grade and the final grade. Given this context, the BIC results indicate an optimal number of clusters of three. Generally speaking, a similar picture emerges as for the previous cluster analysis. While, the findings of the hypotheses test can be largely traced back, the insights on the participants from the "Low" group can again be further refined. As can be seen from the summative results provided in Tables 8 and 9, while a considerable part of this group performs in accordance with the previously developed theoretical framework (Cluster 3), a larger part performs better than expected (Cluster 1). Even more so, a very small percentage is even able to attain very high grades (Cluster 2). Consequently, when considering the results in Table 9, it can be stated that the two-step cluster analysis adds to the ambiguity of the previous results, suggesting that although the overall performance level of participants is related to the hierarchical position of participants, the more detailed findings only provide an equivocal picture.

Table 8: Frequencies of Hierarchical Positions: Two-Step Cluster Analysis on Performance Levels.

	"Low"		"Middle"		"High"	
Cluster	N	%	N	%	N	%
1	43	53.75	22	24.72	9	13.64
2	3	3.75	34	38.20	44	66.67
3	34	42.50	33	37.08	13	19.70

Table 9: Overview Results of Two-Step Cluster Analysis on Performance Levels.

	Participation Grade		Exam Grade		Final Grade	
Cluster	M	SD	M	SD	M	SD
1	7.01	1.22	7.28	0.71	8.06	1.24
2	8.02	1.13	8.32	0.59	9.53	1.15
3	6.14	1.91	7.11	0.76	7.77	1.39

Discussion

The present study set out to identify the impact of participants' hierarchical position on their activity and performance levels in CoLs. Our results from hypotheses testing provided evidence for a positive relationship between the hierarchical position of participants and their level of activity within CoLs (H1). Whereas participants from higher ranks in the organization were more likely to actively contribute to their CoLs in terms of quantitative contributions, participants from lower hierarchical positions in the organization were more likely to be what could be described as "followers". This provides support for the considerations and findings of researchers like Yates & Orlikowski (1992), who argue that top management will proactively set the tone in communication, and Edmondson (2002), who suggested that participants holding lower hierarchical positions will behave more passively in discussions. Additionally, our results indicate that participants from the "High" group also posted more extensive contributions. This is a very interesting finding, as it somewhat questions the applicability of the often mentioned claim that top management is too busy to contribute to discussions (Owens, et al., 2000). The relevance of these findings was supported and further refined by a two-step cluster analysis. Not only was the general relationship between hierarchical position and level of activity confirmed. We also discovered two more striking findings. First, the cluster analysis revealed the existence of a sub-group, which could be labelled as the "Stars". This small group consisted of participants, who really outperformed their colleagues in terms of contributions. Interestingly, the association to this group is independent of the members' hierarchical position. This finding is very closely related to the second addition to the general findings. Contrary to our expectations, a minority of the "Low" group does not confine itself to merely following the discussions. Instead they actively contribute and occasionally even lead the discussions in their CoLs. This can be considered as preliminary support for the findings of Edmondson, et al. (2001), who found that the use of electronic communication technologies had a decreasing effect on the impact of hierarchical positions on teams. Moreover, this result can also be related to our findings on the degree of value diversity among participants. While members of the "Low" and "Middle" group indicated that they really wanted to

learn new skills and concepts during the training program, the "High" group considered this somewhat less important. At face value, one might argue that this ambition to learn, especially among the "Low" group, has translated into active behaviour in the discussion forum for some of the participants.

We also find some evidence that participants' performance is influenced by their hierarchical position (H2). Interestingly, there is a lot of variance in how this translates into actual differences between the different hierarchical groups. Whereas, "Low" and "High" significantly differ in all measures of performance, the other comparisons yielded significant results for different types of measures. Moreover, similarly to the level of activity, the cluster analysis on this set of variables indicated that the "Low" group is really more complex than the hypotheses tests might suggest. While a considerable part performed satisfactorily, a large part performed well, with an even smaller subset being able to really excel and attain similar results as the "High" group. Again, this might be explained by our findings on the degree of value diversity among participants. However, given the effect sizes in question and the frequencies of participants for whom this is applicable, we cannot draw any more concise conclusions at this point in time.

Taken together, if these findings are taken into account for future CoLs, it would be possible to better predict who is likely to be an active participant and stimulate them to engage their colleagues into discussions. Alternatively, potential "followers" could be anticipated and targeted for special support from the beginning of a training program. Finally, these findings provide valuable insights that can help to design collaborative activities that build up on the different professional backgrounds of the participants and create a "hothouse" for new ideas and thoughts (Schlager, et al., 2002).

Limitations and Future Research

The current study exhibits a number of shortcomings that should be taken into account when interpreting the data and drawing conclusions from the presented findings. First, this research has solely focused on descriptive statistics. Although this approach is widely accepted to provide valuable and exploratory input to more elaborate discussions (e.g. Strijbos, et al., 2006), it can only scratch the surface of the underlying social and cognitive relationships. Second, the analysis of participants' activity only investigated participants' level and length of contributions. Although this provides a first glance at the underlying relationships, it only has a limited overall explanatory power. The discussion within the CoLs have also been recorded via transcripted log-files, which also provide information

on whether contributions have been considered by colleagues, or whether they have remained unnoticed. Analyzing this data would provide additional insights on how participants from different hierarchical positions in the organization act in CoLs. Third, this study has assessed participants' performance based on subjective performance measurements (DeChurch & Mesmer-Magnus, 2010). Although this approach is very well suited to attain a first impression of the underlying situation, it normally suffers from more performance irrelevant variance than objective measures, caused for example by rater-bias. As the academic staff, which assessed participants' contributions, facilitated the CoL during the entire period of the e-Learning Phase, they may have in part attended to indicators of cognition that were influenced by certain opinions and expectations about individual participants. Fourth, and very closely related to the previous shortcoming, the performance level is currently assessed on the basis of summative grades. This merely provides a sketch of what might have been discussed and to what extend a CoL has successfully contributed to higher levels of knowledge creation.

Taking into account these limitations, future research should therefore employ a multimethod approach to analyze interaction within CoLs. More specifically, by employing Social Network Analysis (e.g. de Laat, Lally, Lipponen, & Simons, 2007), it would be possible to identify how participants are connected with each other ("one-way" vs. "reciprocal"), whether their background characteristics can help to predict social network positions, and how these relationships might change over time. This in turn would provide valuable insights about the nature of CoLs and whether they are organic entities, with everyone being connected and thereby having a chance to access the knowledge and experiences of others, or whether they are scatter plots, with its members mainly indulging in monologues that are not considered by their colleagues. In addition, Content Analysis studies (e.g. Schellens & Valcke, 2005) can help to categorize the actual level of learning that has taken place within CoLs, identify the degree of knowledge diffusion between participants and the overall level of higher cognitive knowledge attainment. This is especially important in light of our ambiguous findings on the exact impact of hierarchical positions on individuals' performance. Moreover, this type of analysis would allow to make more refined comments on the applicability of the claims that top and middle management are better able to effectively infer upon new information, while lower management can better recall theoretical knowledge (Gijselaers, et al., 2006).

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Appendix A: Example of a typical conversation in the "Café-Talk Forum"

Author: Participant A
Subject: Hello
Message: "Hello from Manila, Philippines. I have been out of the office for the last week, so am already on major catch up time. Hope I can catch you all! I work in Communications, and in the XYZ programme we work on […]. And if that was all we did I would probably have time for this study without too many late nights. But, as often in our organization, the communications team has to support the office in many ways, especially supporting our ZYX team.
But I don't want to moan. I'm excited to be joining this course, as it will be a great chance to exercise my grey matter, and as I've never studied economics, I'll have a lot to learn. Out of work, I'm married with two wonderful sons, aged 4 and 6. They keep me smiling. One asked me this evening why I was watching an old man on the internet (sorry professors!!) and that made me laugh. Looking forward to the challenging weeks ahead, Participant A"

Author: Participant B
Subject: Hello Participant A
Message: "Hello Participant A, Nice to meet you. Welcome to the CoL. Best wishes. Regards, Participant B"

Author: Participant C
Subject: Hi from New York
Message: "Hi Participant A, Thanks for the nice message. I also had to laugh about the anecdote. Very nice to have another dot on the map of our CoL connected -- between New York, Oman, Lesotho and now the Philippines. Looking forward to learning together and to sharing laughs! Best wishes, Participant C"

Author: Participant D
Subject : Welcome Participant A
Message: "A very warm welcome Participant A. Your son's statement made my day. I shared it with my daughter and we had a good laugh! I am sure the mom is as witty as the son! Let us know if you need any tips from us to catch up. Initially I was nervous but now it is getting better and becoming very interesting. Cheers, Participant D"

Appendix B: Example of a typical conversation in a "Content-Related Forum"

Author: Participant A
Subject: Reducing cost of absence
Message: "One of the ways to minimize inconvenience and economic loss to beneficiaries resulting on account of absent health workers or doctors at hospitals or health centre could be to have fixed schedule of services and visits by the doctors and health workers for a given centre. […] The cost of absence of health workers to general public may to a certain extent be reduced in terms of money and logistics."

Author: Participant B
Subject: Reducing cost of absence
Message: "Agree having fixed schedules and informing the public on what services will be available on these dates, is a good idea. This was tried in one remote district and many patients benefited from the services,. It went well because of other factors, timely availability of supplies, transportation costs fully subsidized […]"

Author: Participant C
Subject: Service vs demand
Message: "I fully agree to have fixed schedule for services and notify population. i have practical experience as well. This links demand and service sides and benefit is great..."

Author: Participant D
Subject: Absence
Message: "In Mauritania, some years ago, we had systematically envisaged the housing of the main staff next to the health center to reduce the absences. The results were convincing. Cheers."

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